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EXAMINER	
CHAU, COREY P	

ART UNIT	PAPER NUMBER
2644	

DATE MAILED: 06/21/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/758,606	POMPEI, FRANK JOSEPH	
	Examiner	Art Unit	
	Corey P Chau	2644	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 3/24/04.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-27 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-27 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1, 2, 3, 4, 8, 9, 10, 12, 13, 14, 25, and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5885129 to Norris in view of U.S. Patent No. 6584205 to Croft, III et al. (hereafter as Croft), and further in view of ACUSTICA, Vol. 4, 1954, No. 5, "Condenser Transmitters and Microphones with Solid Dielectric for Airborne Ultrasonics" by Kuhl et al (hereafter as Kuhl).

3. Regarding Claim 1, Norris discloses a toy having a parametric speaker (Fig. 2, reference 42) comprising an ultrasonic frequency generator (i.e. ultrasonic signal source) (Fig. 2, reference 54), a sonic frequency generator (i.e. audio signal source) (Fig. 2, reference 58), modulator (Fig. 2, reference 50), transducers (Fig. 2, reference 70), and means for applying the modulated carrier to the transducer (Fig. 2). The transducers emit a 5kHz sonic compression wave at the target (i.e. acoustic transducer array has a bandwidth of greater than 5 kHz) (column 3, lines 50-65). Applicant argues that Norris does not discloses the acoustic transducer array having a bandwidth of greater than 5 kHz, however the toy having parametric speaker propagates at least two ultrasonic frequencies and concurrently generating a new sonic frequency. The two ultrasonic frequency are above 5 kHz, therefore the acoustic transducer array has a bandwidth greater than 5 kHz. Applicant amended the claim to recite at least one signal conditioner configured for

receiving the at least one audio signal and for nonlinearly processing the audio signal to provide at least one pre-distorted signal. Norris does not expressly disclose a signal conditioner configured for receiving at least one audio signal and for nonlinearly processing the audio signal to provide at least one pre-distorted signal. However it is well known in the art to pre-distort a signal to compensate for distortions caused by non-linear propagation characteristics of air. Croft for example discloses system for pre-processing (i.e. signal conditioner) an audio signal that will result in lower distortion and better reproduction of an acoustic signal for a parametric array output (fig. 14, reference 110 and 114; column 3, lines 39-42; column 8, line 45 to column 9, line 17; claim 10). Therefore it obvious to one of ordinary skill in the art to provide such a pre-processor wherein the audio signal that will result in lower distortion and better reproduction of an acoustic signal for a parametric array output. Norris as modified discloses a transducer array, but only generally; no specific hardware or software is taught. Therefore it would have been obvious to one having ordinary skill in the art to seek known transducers thereby inverting distortion in the projected signal. Kuhl for example discloses a condenser type (i.e. Sell-type) transducer comprising a backplate with grooves (i.e. depressions), therefore providing an inverted distortion in the projected signal (page 2, paragraph 2; fig. 1b; page 7). It would have been obvious to one having ordinary skill in the art at the time the invention was made to employ any known transducers, such as Kuhl. Therefore it would have been obvious to one having ordinary skill in the art to modify the transducer with the teach of Kuhl to utilize a condenser type transducer comprising a backplate with grooves.

4. Regarding Claim 2, Norris as modified discloses each acoustic transducer is a membrane-type transducer (i.e. condenser type).

5. Regarding Claim 3, Norris as modified discloses the membrane-type transducer is a Sell-type electrostatic transducer (Kuhl, page 1).

6. Regarding Claim 4, Norris as modified discloses the membrane-type transducer comprising a conductive membrane (i.e. diaphragm and metallic layer), a backplate electrode (i.e. metallic backplate), and a DC bias (i.e. dc voltage) source between the conductive membrane and the backplate electrode (Kuhl, figs 1a –c; column 3, paragraph 2).

7. Regarding Claim 8, Norris as modified discloses conductive membrane, a backplate electrode, and a dielectric spacer (Kuhl discloses solid dielectrics can also be used as transmitters) disposed between the conductive membrane and the backplate electrode.

8. Regarding Claim 9, Norris as modified discloses a conductive membrane, an electrode, and an insulative backplate (Kuhl discloses the transmitter consisting of an externally metallised diaphragm of plastic is stretched over the metallic back plate, wherein the black plate is either circular, rectangular, or cylindrical) (column 3, paragraph 2) disposed between the conductive membrane and the electrode.

9. All element of Claim 10 are comprehended by Claim 1. Claim 10 is a rejected for the reasons stated above apropos to Claim 1.

10. Regarding Claim 12, Norris as modified discloses a transducer and a modulated carrier signal and it is inherent that the transducer has an area and the modulated carrier signal has an amplitude (Fig. 2, reference 70; Fig. 3). Therefore, using the area and the amplitude to define loudness.

11. Regarding Claim 13, Norris as modified discloses a modulated carrier signal wherein the amplitude varies, therefore it is obvious that it can provide a loudness greater than $(2.0x10^{4})$ Pa^{2} x in^{2} (column 3, lines 45-48; column 6, lines 57-61).

12. Claim 14 is essentially similar to Claim 13 and is rejected for the reasons stated above apropos of Claim 13.

13. Regarding Claim 25, Norris as modified discloses an acoustic transducer array (fig. 2), comprising: a backplate including a surface and a plurality of respective depressions of varying dimensions formed on the surface (Kuhl, fig. 1b; page 3, paragraph 2 to page 4, paragraph 2); and a membrane adjacently disposed along the backplate (Kuhl, figs. 1a – c), wherein the membrane and at least one of the plurality of respective depressions define at least one acoustic transducer, and wherein the dimensions of the respective depressions are set to determine the center frequency and the bandwidth of the at least one acoustic transducer (it is inherent that the grooves determine the center frequency and the bandwidth of the acoustic transducer) (Kuhl, fig. 1b; page 3, paragraph 2 to page 4, paragraph 2).

14. All elements of Claim 26 are comprehended by Claim 1. Claim 26 is rejected for the reasons stated above apropos to Claim 1.

15. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5885129 to Norris in view of U.S. Patent No. 6584205 to Croft, III, and further in view of ACUSTICA, Vol. 4, 1954, No. 5, "Condenser Transmitters and Microphones with Solid Dielectric for Airborne Ultrasonics" by Kuhl as applied to claims 1, 2, 3, 4, 8, 9, 10, 12, 13, 14,

25, and 26 above, and further in view of Applicant's admitted prior art and even more further view of U.S. Patent No. 5394732 to Johnson et al. (hereafter as Johnson).

16. Regarding Claim 5, Norris as modified does not expressly discloses a driver amplifier coupled between the modulator and the acoustic transducer array and configured to receive the converted signal and to generate an amplified signal representative of the converted signal, however it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide such a driver amplifier for amplifying the modulated carrier signal, as discloses by applicant's admitted prior art (page 1, paragraph 0004). Norris as modified does not expressly discloses a blocking capacitor coupled between the driver amplifier and the acoustic transducer array and configured to block the DC bias from the driver amplifier, however it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide a blocking capacitor to block the DC bias from the driver amplifier, as taught by Johnson.

17. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5885129 to Norris in view of U.S. Patent No. 6584205 to Croft, III, and further in view of ACUSTICA, Vol. 4, 1954, No. 5, "Condenser Transmitters and Microphones with Solid Dielectric for Airborne Ultrasonics" by Kuhl as applied to claims 1, 2, 3, 4, 8, 9, 10, 12, 13, 14, 25, and 26 above, and further in view of U.S. Patent No. 3565209 to Babcock et al (hereafter as Babcock).

18. Regarding Claim 6, Norris as modified discloses does not expressly disclose a first component coupled between the acoustic transducer array and the DC bias source and configured

to block the amplified signal from the DC bias source. Babcock discloses an apparatus to generate an acoustic output that contains a choke (i.e. first component) to prevent the output current from an amplifier from flowing through a bias voltage source as part of a process to reduce distortion of a acoustic signal (Fig. 2; Fig. 3; column 2, lines 26-30 and lines 52-72). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the toy having a parametric speaker of Norris with the teaching Babcock to incorporate a choke between the acoustic transducer array and the DC bias source to prevent the output current from an amplifier from flowing through a bias voltage source as part of a process to reduce distortion of a acoustic signal.

19. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5885129 to Norris in view of U.S. Patent No. 6584205 to Croft, III, and further in view of ACUSTICA, Vol. 4, 1954, No. 5, "Condenser Transmitters and Microphones with Solid Dielectric for Airborne Ultrasonics" by Kuhl, as applied to claims 1, 2, 3, 4, 8, 9, 10, 12, 13, 14, 25, and 26 above, and further in view of U.S. Patent No. 3373251 to Seeler.

20. Regarding Claim 7, Norris as modified does not expressly disclose a DC bias source provided by an embedded charge. Seeler discloses an electrostatic transducer that provides a thin plastic film diaphragm with an electrically conductive surface on the side opposite that in contact with a back plate, which surface may either be polarized in the form of an electret or have a bias voltage applied thereto, to provide a desired electrostatic field between the conductive layer on the diaphragm and the electrically conductive back plate (i.e. DC bias source provided by an embedded charge) (column 2, lines 30-37). Therefore, it would have been obvious to one having

ordinary skill in the art at the time the invention was made to modify the toy having a parametric speaker of Norris with the teaching of Seeler to have the diaphragm of Norris be an electret diaphragm to provide a desired electrostatic field between the conductive layer on the diaphragm and the electrically conductive back plate.

21. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5885129 to Norris in view of U.S. Patent No. 6584205 to Croft, III, and further in view of ACUSTICA, Vol. 4, 1954, No. 5, "Condenser Transmitters and Microphones with Solid Dielectric for Airborne Ultrasonics" by Kuhl, as applied to claims 1, 2, 3, 4, 8, 9, 10, 12, 13, 14, 25, and 26 above, and further in view of U.S. Patent No. 4991221 to Rush.

22. Regarding Claim 11, Norris as modified discloses all elements of Claim 11 except for a matching filter. Rush discloses use of an electronic crossover utilizing a modified 24-dB/oct design to divide up a signal into frequency bands to be supplied to a tweeter and bass drivers, as well as to compensate for the characteristics of the drivers, in order to provide a flat frequency response curve for the entire speaker (i.e. matching filter) (abstract). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the toy having a parametric speaker of Norris with the teaching Rush to incorporate an electronic crossover before the driving amplifier that utilizes a modified 24-dB/oct design to divide up a signal into frequency bands to be supplied to a tweeter and bass drivers, as well as to compensate for the characteristics of the drivers, in order to provide a flat frequency response curve for the entire speaker.

23. Claims 15, 16, 17, 19, and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5885129 to Norris in view of U.S. Patent No. 6584205 to Croft, III, and further in view of ACUSTICA, Vol. 4, 1954, No. 5, "Condenser Transmitters and Microphones with Solid Dielectric for Airborne Ultrasonics" by Kuhl, as applied to claims 1, 2, 3, 4, 8, 9, 10, 12, 13, 14, 25, and 26 above, and further in view of U.S. Patent No. 5406503 to William, Jr et al. (hereafter as William).

24. Claim 15 is essentially similar to Claim 1 and is rejected for the reasons stated above apropos to Claim 1. Norris as modified does not expressly disclose an inductor coupled to a capacitive load of the acoustic transducer, however it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide such an inductor in order to provide power to drive the audio system, as taught by William.

25. Regarding Claim 16, Norris as modified discloses an ultrasonic carrier signal greater than 45kHz (Norris, column 3, line 66 to column 4, line 4).

26. Regarding Claim 17, Norris as modified discloses an ultrasonic carrier signal greater than 55kHz (Norris, column 3, line 66 to column 4, line 4).

27. All elements of Claim 19 are comprehended by Claim 15. Claim 19 is rejected for the reasons stated above apropos to Claim 15.

28. All elements of Claim 27 are comprehended by Claims 1 and 15. Claim 27 is rejected for the reasons stated above apropos to Claims 1 and 15.

29. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5885129 to Norris in view of U.S. Patent No. 6584205 to Croft, III, and further in view of

ACUSTICA, Vol. 4, 1954, No. 5, "Condenser Transmitters and Microphones with Solid Dielectric for Airborne Ultrasonics" by Kuhl, as applied to claims 1, 2, 3, 4, 8, 9, 10, 12, 13, 14, 25, and 26 above, and further in view of U.S. Patent No. 5406503 to William and even more further view of U.S. Patent No. 4122725 to Thompson.

30. Regarding Claim 18, Norris as modified discloses all elements of Claim 18 except for a driving amplifier further including a damping resistor coupled between the inductor and the capacitive load of the acoustic transducer array. Thompson discloses use of an inductor and a damping resistor that are connected electrically across transducers. The inductor resonates with a clamped capacitance of the transducer at a resonant mode frequency of the transducer elements so that a significant amount of driving energy is dissipated in the damping resistor (column 2, lines 52-60). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the toy having a parametric speaker of Norris with the teaching Thompson to incorporate a damping resistor coupled between an inductor and a capacitor to allow the inductor resonates with a clamped capacitance of the transducer at a resonant mode frequency of the transducer elements so that a significant amount of driving energy is dissipated in the damping resistor.

31. Claims 20, 21, 22, 23, and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5885129 to Norris in view of U.S. Patent No. 6584205 to Croft, III, and further in view of ACUSTICA, Vol. 4, 1954, No. 5, "Condenser Transmitters and Microphones with Solid Dielectric for Airborne Ultrasonics" by Kuhl as applied to claims 1, 2, 3, 4, 8, 9, 10,

12, 13, 14, 25, and 26, and further in view of Applicant's admitted prior art and even more further view of U.S. Patent No. 4005382 to Beaver.

32. Claim 20 is essentially similar to Claim 1 and is rejected for the reasons stated above apropos to Claim 1. Norris as modified discloses a parametric speaker to generate at least one new sonic frequency from at least two ultrasonic frequencies of different values, and projects them directionally toward a target area (abstract), but only generally; no specific hardware or software is taught. Therefore it would have been obvious to one having ordinary skill in the art to seek known methods to project the signals directionally towards a target area. Beaver discloses proper selection of the delay value between adjacent transducer can accomplish preferential ultrasonic reception or transmission in particular directions (abstract). The delay value is given by the expression $Y = (d/c) \sin \theta$, where "d" is the spacing between adjacent transducer elements, "c" is the velocity of the ultrasonic wave in the medium through which it travels, and "θ" is the steering angle (column 3, lines 41-68; column 7, line 62 to column 8, line 48). It would have been obvious to one having ordinary skill in the art at the time the invention was made to employ any known methods to project the signals directionally towards a target area, such as Beaver. Therefore it would have been obvious to one having ordinary to modify the toy of Norris as modified with the teaching of Beaver to utilize a delay value between adjacent transducer can accomplish preferential ultrasonic reception or transmission in particular directions.

33. Claim 21 is essentially similar to Claim 20 and is rejected for the reasons stated above apropos of Claim 20.

34. All elements of Claim 22 are comprehended by Claims 1 and 20. Claim 22 is rejected for reasons stated above apropos to Claims 1 and 20.

35. Regarding Claim 23, Norris as modified discloses grooves (i.e. depressions) and it is inherent that the grooves (i.e. depressions) determine the center frequency and the bandwidth of the acoustic transducer (Kuhl, page 3, paragraph 2 to page 4, paragraph 2).

36. All elements of Claim 24 are comprehended by Claim 20. Claim 24 is rejected for reasons stated above apropos to Claim 20.

Conclusion

37. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Corey P Chau whose telephone number is (703)305-0683. The examiner can normally be reached on Monday - Friday 9:00 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Forester W Isen can be reached on (703)305-4386. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

June 1, 2004

XU MEI
PRIMARY EXAMINER